

EVALUATION OF A DUTCH EDUCATIONAL “DRIVING WHILE INTOXICATED (DWI)” PREVENTION PROGRAM FOR DRIVING SCHOOLS*

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ABSTRACT

A DWI prevention program for driving schools consisting of a videotape, slides, a textbook, and a manual was developed and evaluated. Effects of the program on knowledge, attitude, behavior intention, and self-reported DWI behavior were measured by means of a pretest, posttest, one-year follow-up evaluation design. Two-hundred and eight driving school students followed the program and participated in all three measurements. A control group of 228 pupils followed a traditional curriculum without the DWI program and also participated in all three measurements. Principal findings were that knowledge improved, attitudes and behavior intentions were already positive at pretest, DWI was equally reported by both groups, and there was a positive effect on riding with an intoxicated driver.

INTRODUCTION

In The Netherlands, nearly 100 percent of the people who wish to obtain a driver's license are attending a driving school. A percentage of 75 percent are not only following a practical driver instruction, but also a theoretical curriculum [1]. Therefore, offering an educational program to driving schools in order to prevent

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driving under the influence is a logical measure. About 85 percent of the pupils of driving schools are between seventeen and twenty-five years of age, the age group with the greatest risk of alcohol-related traffic accidents [2]. As is the case in other countries, many intoxicated drivers are under twenty-five, especially in late-night weekend hours [3]. Thus, pupils of driving schools are an important, but mostly neglected, target group for primary prevention of DWI behavior. A prevention program for DWI is a unique approach, since most DWI programs are offered at a later point in time to first time offenders [8] and multiple offenders [4-7]. Given the serious lethal consequences characteristic of DWI, we advocate intervention *before* the offense occurs rather than after.

Additional arguments for developing a preventive strategy directed at driving schools are that a DWI prevention program can be integrated into an existing curriculum in such a way that driving schools can guarantee continuity, and that a substantial number of driving schools are willing to implement the DWI theme in their curriculum [9]. In current driving schools curriculum information on alcohol-impaired driving is either absent or very minimal. Traditionally, the curriculum deals with topics concerning the highway code and is directed primarily at passing the driving test. Recently, interest has moved toward paying more attention to social aspects of driving. Beyond learning how to drive, an emphasis on driving safely is now valued more highly. A DWI prevention program fits with this new focus.

PROGRAM DESCRIPTION

The DWI prevention program we present in this article is based on conditions of effective public information and education [10-13]. Kok's model of behavior change through information [14] was used for program development which is based on the concepts of Fishbein and Ajzen [15], McGuire [16], and Rogers [17]. Kok's model centralizes the individual and integrates the following conditions of effective public information mentioned in the literature: giving credible and attractive information, bringing awareness to existing risks, presenting clear and understandable standards, demonstrating short-term advantages, adapting program content to the needs of the target group.

The knowledge-attitudes-behavior approach focuses on providing information in order to promote appropriate attitude and behavior changes. This differs from an approach directed at values and decision making, which promotes self understanding and responsible decision making, and from a social competency approach which concentrates on modeling health-promoting behaviors and teaching skills [18]. Our DWI program aims at enhancing knowledge, improving or maintaining positive attitudes, and preventing DWI behavior.

After testing the program, simply named "Driving While Intoxicated," in a pilot study with a small group of pupils and teachers of driving schools, some adjustments were made [19]. The program is given in five or six lessons, one DWI

module of fifteen to twenty minutes length in each lesson. The curriculum topics include: 1) the use of prescription and non-prescription drugs while driving, such as alcohol, medicine, cannabis, 2) legal aspects of DWI, and 3) behavior (self-control methods). The total package consists of a twenty-page, richly illustrated textbook, thirty-five slides, a videotape of twenty-two minutes, and a manual for the instructor. The instructor's manual contains: 1) a verbatim script for each module, 2) text corresponding with the slides, 3) background information on DWI, such as figures and detailed description of the law, 4) tips for enriching the lessons, such as inviting guest speakers, demonstrating a breathalyzer, and 5) topics to discuss, for example, "it is my own responsibility to drink and drive" or "any alcohol before driving should be forbidden." An active learning approach rather than a passive learning approach is achieved by the use of a variety of media and a priority on group participation in discussions. In addition to an active learning approach, we take a "person-directed approach," adapting the program to the specific needs, problems, and social standards of the target group, which in our case are adolescents and young adults. It is our opinion that this approach is more effective than one of presenting values and moral judgment. Thus, we strictly exclude a moralistic approach from our program.

METHOD

Subjects

First we selected driving schools and from them, students. Randomly, one-half of all approximately 2000 large driving schools in Holland was approached for participation of which 297 volunteered. Based on geographical criteria, 100 schools were selected. They were divided at random into forty-six schools that implemented the DWI-module in their curriculum and fifty-four schools that did not.

In the spring of 1987, a group of 874 students from those 100 schools completed the research questionnaires both before and after their curriculum. Out of this group, 568 subjects (65%) agreed, by then, to participate in a follow-up evaluation. Of this group, 436 (77%) could actually be followed-up one year later: 208 subjects in the experimental condition and 228 subjects in the control condition. No significant differences in age, sex, level of education, marital status, and drinking behavior were found between those who were willing to participate in a follow-up evaluation (65%), and those who were not. Nor were there significant differences between those who actually participated in the follow-up (77%), and those who did not.

Given our relatively low refusal rate, we conclude the subjects are representative of the population of pupils of driving schools. In both groups, 90 percent of the pupils were between seventeen to twenty-five years of age (mean age 20): 40 percent males and 60 percent females. At the pretest, 85 percent reported

drinking alcohol. Unaccountably, a significant difference between groups was found at the baseline measurement: the control group had a higher level of former education ($p < .05$, t -test). No significant differences occurred for age, sex, marital status, and drinking behavior.

Design

A pretest, posttest, and one-year follow-up evaluation design was employed to examine the effects of the program on knowledge, attitude, intention, and behavior. In all schools the traditional curriculum consists of six weekly sessions of approximately ninety minutes. For the experimental group, the DWI module was added to this curriculum in sessions of approximately fifteen minutes each over all six weeks. The time spent on the entire DWI-module was two hours at the most.

Instruments

Subjects completed a questionnaire consisting of eleven knowledge items (true-false), six attitude items (5-point scale); six behavior-intention items (4 yes/no, 2 open-ended), and five items referring directly to DWI behavior. All eleven knowledge items were derived from the information given in the program in such a way that all topics were represented proportionately in the items, e.g., "Heavy people are not as quickly affected by alcohol as people who are less heavy," "A standard glass of spirits contains much more alcohol than a standard glass of beer," "The legal limit of the blood alcohol concentration is .08 percent."

To measure attitudes toward DWI, a six-item questionnaire was constructed (see Table 1). Attitude toward DWI was conceptualized as the viewpoint of the consequences of DWI. Two instructions were selected. A three-item questionnaire from Bos et al. [20], measuring the acceptance of negative consequences, and a five-item questionnaire from de Bruin [3], measuring the perception of dangerous effects of DWI were used. All items were scored on a 5-point scale ranging from "absolutely agree" to "absolutely disagree." The psychometric quality of the eight items was assessed in the scores of the respondents in this study (pretest, $n = 781$). Factor analysis yielded two subscales in accordance with the original scales. The items and the loadings of factor analysis after varimax rotation are in Table 1. The internal consistency of the scales are Cronbach's $\alpha = .71$ for scale 1 and .51 for scale 2.

Four of the six behavior-intention items measure the specific intention of the subject not to drive: "not driving after use of alcohol if people tell me not to," "not drinking more than three beverages before driving," "not driving after use of a sleeping drug," "warning a friend who had too much alcohol before driving."

Two other behavior-intention items explicitly inquire about the maximum number of beverages the subject will drink: 1) "Suppose you are hitting the town with some heavily drinking friends. Let's say from 10 P.M. till 2 A.M. What is your

Table 1. Attitude Items and Their Loadings after Factor Analysis

	Factor Loadings	
	I	II
Scale 1: "Acceptance of negative consequences of DWI"		
When I DWI:		
I should be caught by the police	.83	
I find myself anti-social	.73	
My driver's license should be suspended	.77	
Scale 2: "Perception of negative effects of DWI"		
When I DWI:		
My fellow passengers will feel at ease		.79
I am a danger to other traffic		.58
I am very liable to cause an accident		.52

maximum number of alcoholic drinks, spread over those four hours, if you are supposed to drive home afterwards?" 2) "What is your maximum number of alcoholic drinks if you have to drive within the next two hours?"

Three behavior items refer to driving under the influence of alcohol, one item refers to driving under the influence of medicinal drugs, and one last item to driving under the influence of marijuana or hashish. At the same time respondents were asked to point out in which situation they drank, how many beverages in how many hours they drank, and how many kilometers they drove after drinking.

Procedure

The questionnaire was filled in by the subjects in the classrooms of their driving schools just before the program started (pretest), and directly after the program concluded (posttest). One year later (follow-up), information was obtained by means of a mailed postal questionnaire to the pupils' homes.

RESULTS

Knowledge

Analysis of variance yielded a significant interaction effect ($F = 44.38$, $p < .001$) for knowledge. The knowledge of the effects of DWI of the experimental group increased more than the knowledge of the control group (Figure 1). In fact, the knowledge of the control group remained at the same initial level

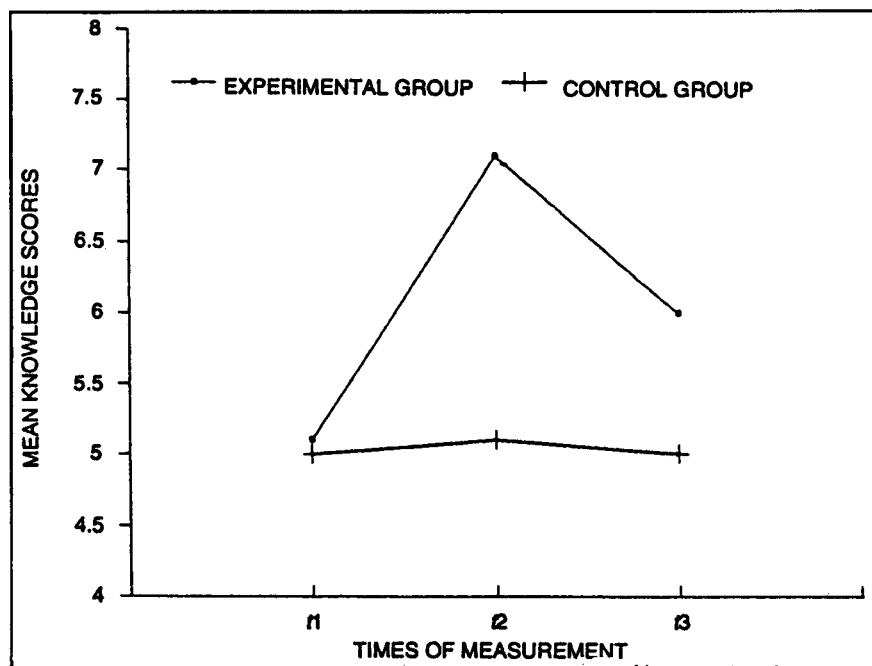


Figure 1. Knowledge of the effects of DWI of the experimental group compared with the control group.

(mean = 5). The mean knowledge of the experimental group increased from 5.1 at t_1 to 7.1 at t_2 and decreased to 6.0 at t_3 ; differences between t_1 and t_2 and t_1 and t_3 were all significant ($p < .001$, t -test).

It is interesting to note that the knowledge on some topics increased more than on others. In the long run (t_1 - t_3), the experimental group, as opposed to the control group, made the most progress on the items "Drinking coffee lessens the sedative effect of tranquilizers" (false), "Drivers under the influence of marijuana or hashish tend to underestimate their driving performance" (true), "A BAC of more than .25 percent can lead to two weeks imprisonment and one year suspension of driver's license" (true). These items refer to the topics on medicine, cannabis, and legal aspects.

Attitude

Analysis of variance revealed no condition effect for scale 1 ($F = .81$, $p > .05$); both groups increasingly accept the consequences of DWI. However, there is a condition effect for scale 2 ($F = 3.92$, $p < .05$); the experimental group developed

toward a more positive attitude, whereas the control group moved toward a more negative attitude, as can be seen in the mean scores in Table 2.

It seems that the program prevents attitude deterioration on the awareness of danger scale. It should be observed that changes are mainly in the area of a positive attitude. Both groups already seemed to have positive attitudes: if the two extremes "agree" and "strongly agree" are taken together, it can be said that two-thirds of the pupils accept the consequences, and that 90 percent of them are aware of the dangerous effects of DWI.

Behavior Intention

As was the case with attitude, both experimental and control groups expressed a positive behavior intention on all items at all three measurements: about 85 to 90 percent (see Table 3).

However, on item 1 an effect was found that is worth mentioning. At $t1$ in both groups, ca 7 percent stated that they will drive after drinking when other people tell them not to drive. In the experimental group, this number diminishes significantly to 3 percent directly after the program concluded, and to 2.2 percent one year later. This is a significantly larger reduction than in the control groups ($p < .05$, McNemar test).

On items 2 and 3 a positive change was found in both groups one year later. Significantly fewer people intend to drink more than three alcoholic drinks at a wedding party (in both groups $p < .001$, McNemar test) and significantly fewer people intend to drive after taking a sleeping drug (experimental group chi-square = 9.30, $p < .01$; control group chi-square = 5.95, $p < .05$, McNemar test). There are no significant differences between experimental and control groups in this respect.

Two behavior-intention items inquired about maximum number of drinks consumed before driving. At $t1$ the experimental group reported a maximum of

Table 2. Mean Attitude Score for Experimental Group ($n = 208$) and Control Group ($n = 228$) at Pretest ($t1$), Posttest ($t2$), and Follow-Up ($t3$)^a

	Experimental Group			Control Group		
	$t1$	$t2$	$t3$	$t1$	$t2$	$t3$
Scale 1: Acceptance of consequences of DWI	2.2	2.1	1.9	2.2	2.1	1.9
Scale 2: Awareness danger as consequence of DWI	1.8	1.7	1.7	1.7	1.7	1.8

^a 1 = Positive Attitude, 5 = Negative Attitude.

Table 3. Percentage of Pupils of Driving Schools on Behavior Intention on Pretest (*t* 1), Posttest (*t* 2), and Follow-Up (*t* 3)

	Experimental Group (<i>n</i> = 208)			Control Group (<i>n</i> = 228)		
	<i>t</i> 1	<i>t</i> 2	<i>t</i> 3	<i>t</i> 1	<i>t</i> 2	<i>t</i> 3
#1. Driving after drinking if people are telling you not to drive.						
Driving	7.1	3.0	2.2	6.4	4.5	4.4
Not driving	92.9	97.0	97.8	93.6	95.6	95.6
#2. Drinking more than three beverages at a wedding.						
Yes	12.6	10.1	4.8	13.4	13.6	4.3
No	87.4	89.9	95.2	86.6	86.6	95.7
#3. Driving the morning after taking a sleeping pill.						
Yes	23.2	15.5	12.9	23.0	11.9	13.5
No	76.8	84.5	87.1	76.9	84.9	86.5
#4. Warning a friend who is drinking too much before driving.						
Yes	81.9	83.1	79.9	80.2	81.7	84.2
No	18.1	16.9	20.1	19.8	17.8	15.8

1.7 intended drinks in four hours (see Table 4); this figure decreased to 1.2 drinks at *t*3 (*sd* = 1.6, *t* = 3.93, *p* < .001, *t*-test); the control group reported 2.1 drinks at *t*1 and 1.6 drinks at *t*3 (*sd* = 3.1, *t* = 2.31, *p* < .05, *t*-test). So both groups reduced their drinking intention one year after the curriculum.

The second item was analyzed only for those pupils who obtained their driver's license at *t*3 (100 in the experimental and 96 in the control group): subjects of the experimental group at *t*1 intended to drink no more than 1.3 glasses of alcoholic drinks, which decreased to 0.9 glasses at *t*3 (*sd* = 1.5, *t* = 2.61, *p* < .05, *t*-test). Subjects of the control group intended to drink 1.3 drinks at *t*1 and 1.1 drinks at *t*3 (no significant difference).

Self-Reported Behavior

Since pupils of driving schools cannot obtain their driver's license before completing the curriculum and, thus, after *t*2, the only comparison made between

Table 4. *T*-Test Pairs Scores for Experimental Group ($n = 208$) and Control Group ($n = 228$) on Drinking Intention Items between Pretest ($t1$) and Posttest ($t2$) and Pretest ($t1$) and Follow-Up ($t3$).

	m1	m2	<i>d</i>	<i>sd</i>	<i>T</i>	<i>df</i>	2-tail <i>p</i>	<i>N</i>
Experimental Group								
#5. $t1-t2$	1.1	1.6	.5	7.1	-.93	165	.35	166
$t1-t3$	1.3	.9	.4	1.5	2.61	99	.01*	100
#6. $t1-t2$	1.6	1.9	.3	2.4	-1.41	180	.16	181
$t1-t3$	1.7	1.2	.5	1.6	3.93	163	.00**	164
Control Group								
#5. $t1-t2$	1.5	1.2	.3	1.9	1.93	170	.06	171
$t1-t3$	1.3	1.1	.2	1.8	1.22	95	.23	96
#6. $t1-t2$	2.1	1.9	.2	2.4	1.28	195	.20	196
$t1-t3$	2.1	1.6	.5	3.1	2.31	189	.02*	190

Note: *N* differs because not everyone answered all questions. On $t3$, item 5 is only answered by people in possession of a driver's license.

* $p < .05$

** $p < .001$

both groups in regard to self-reported behavior is at $t3$. Both groups are comparable in terms of age, sex, marital status, drinking behavior, and kilometers driven. As was measured at the pretest: the control group had a higher level of former education ($p < .05$, *t*-test).

There is no evidence that the DWI program had any effect upon reported driving while under the influence, as can be seen in Table 5.

It should be highlighted that more than 20 percent of all respondents reported driving while under the influence of at least two alcoholic drinks within the first year after obtaining their driver's license. More than half (56%) of the experimental group who drove after drinking two or more beverages ($n = 27$) reported only one occasion of DWI in the past year, 44 percent more than one occasion, whereas for the control group ($n = 23$) the percentages were 70 percent and 30 percent, respectively. The mean number of drinks for the experimental group was 3.3 in 3.6 hours, for the control group it was 4.4 drinks in 2.9 hours. The experimental group reported to drive an average of 15.4 kilometers (9.6 miles) after drinking, the control group 18.3 kilometers (11.4 miles).

The questionnaire also included an item asking whether they had ridden with an intoxicated driver in the past year. The same question was asked for the past four weeks. It may be concluded that after following the DWI program the experimental group diminished riding with an intoxicated driver. Table 6 shows that at *t*1, 74 percent reported riding with an intoxicated driver, which had decreased to 58 percent one year later ($\chi^2 = 7.31, p < .01$, McNemar test).

The same results were found in regard to the past four weeks: a drop from 41 percent to 28 percent ($\chi^2 = 3.84, p < .05$, McNemar test). Within the control group, no significant differences can be found. It should be mentioned, however, that prior to the curriculum the control group reported significantly less riding with an intoxicated driver than the experimental group.

Table 5. Cumulative Percentage of Pupils of Driving Schools in Possession of a Driver's License Reporting DWI in the Past Year^a

	Experimental Group (<i>n</i> = 117)	Control Group (<i>n</i> = 112)
Under the influence of:		
≥ six beverages	1.7 (2)	3.6 (4)
≥ four beverages	7.7 (7)	9.0 (6)
≥ two beverages	23.1 (27)	20.5 (23)
Medicinal drug	2.7 (3)	0.9 (1)
Marijuana or hashish	0.0	0.0

^aAbsolute numbers in parentheses.

Table 6. Percentage of Pupils of Driving Schools in Possession of a Driver's License Reporting Riding with an Intoxicated Driver

	Experimental Group (<i>n</i> = 117)			Control Group (<i>n</i> = 112)		
	<i>t</i> 1	<i>t</i> 2	<i>t</i> 3	<i>t</i> 1	<i>t</i> 2	<i>t</i> 3
Past year	73.5	65.0	58.1	57.1	57.1	54.5
Past four weeks	41.0	30.8	28.2	25.9	17.9	24.1

Reliability Check

In order to check the data on self-reported DWI behavior, their reliability was examined in three ways: 1) interviews with significant others, 2) in-depth interviews with pupils, and 3) a study of judicial records.

- 1) Seven of sixty-two respondents (11%) who reported not driving while intoxicated in the past year, were reported by significant others (friend or family member) of demonstrating DWI behavior. There is a 95 percent probability that this percentage of 11 percent lies between 4 percent and 22 percent [21].
- 2) In-depth interviews by telephone were held with a group of all twenty-two respondents who, in the pretest, reported drinking more than ten glasses of alcohol on occasion but who, in the follow-up, reported never having driven after drinking. It is assumed that doubts concerning reliability of self-reported DWI behavior should be greatest within this group. Only one of them reported DWI in the telephone interview.
- 3) Given the low chance of getting caught for DWI, studying judicial records is useful only if the number of pupils to observe is sufficiently large. In this study, only 229 respondents were in possession of a driver's license. The fact that none of them had a history of DWI offenses in the period of one year does not warrant any conclusion.

Based on the interviews with significant others, the underreporting is estimated to be around 11 percent. The in-depth interviews and records research did not provide any reason to consider a higher percentage.

DISCUSSION

To summarize the effects of our prevention program: the DWI module program produced a significant increase in knowledge, a more positive attitude at follow-up toward the concept "awareness of danger as a consequence of DWI" (the control group actual became more negative), and some evidence that it reduced intentions to consume more than one drink before driving within the next two hours. There was no evidence that it had any effect upon reported drinking and driving behavior.

We conclude from our findings that participation in a DWI program does lead to improved knowledge about DWI. The fact that greatest improvements are accomplished on items referring to the topics of driving under the influence of medicines, driving under the influence of cannabis, and legal aspects, implicate that it is worthwhile to pay attention to these topics. This makes the program also interesting for those who are reluctant to be taught facts about alcohol.

Also, knowing the answers of seven of eleven items is not a maximum effect.

Attitudes and behavior intentions appeared positive during the pretest and remained so. The results implicate that one should try to strengthen attitudes and intentions rather than to change them. More important, the program seems to prevent attitude deterioration (awareness of danger), and results indicate that the group of pupils licensed to drive, plan to drink less alcohol before driving, compared to a control group. In addition, it seems that attitudes and intentions are not adequate predictors of actual behavior: those who reported DWI in the past year also reported a positive attitude and behavior intention toward DWI.

No effect on actual DWI behavior was found: in both experimental and control group more than 20 percent reported DWI behavior in the past year. This means that one of five persons drives under the influence of alcohol in the first year of having a license. We conclude it is not easy to influence DWI behavior, though the experimental group reported using methods to control drinking behavior more than the control group (76% versus 62%). These methods, i.e., having a non-alcoholic drink in mind, saying no, drinking small sips, putting your glass down instead of holding it in your hand, drinking not more than one beverage each hour, leaving a small amount of alcohol in your glass in order to prevent it from being filled up by others a second time, were mentioned in the textbook.

A remarkable effect of the program is the positive impact on the behavior of riding with an intoxicated driver. It is recommended that this should be an explicit goal of DWI prevention programs. The target group should be approached not only as potential intoxicated drivers, but also as the social environment of intoxicated drivers. This will stimulate social control.

Why didn't we find larger effects on attitude, behavior intention, and behavior? Some reasons are given here.

Seen from a didactical point of view, the program is probably not put to optimal use. One of the most important elements of the program was to elicit discussions in order to make the pupils think about DWI topics themselves. But not all teachers of driving schools can be expected to have the necessary skills directly available in their repertoire. Evaluation of the discussions supports this expectation: 50 percent of the pupils said there was little discussion, though 75 percent of the teachers did use at least one topic to discuss about each lesson. Further research should pay more explicit attention to discussion as an element of the curriculum, to get a better insight on the role of discussion in the process of behavior change and attitude change.

The results also reflect that the program was well received among teachers as well as pupils. All teachers and 85 percent of the pupils reported that the program was interesting, educational, well-organized, and easy to understand. One difficulty with program implementation, however, was that teachers did not always know how to handle pre-existing resistance of pupils to a DWI program. Therefore, the latest edition of the manual includes information about how to deal with resistance. It takes effort, time, and talent to acquire the necessary teaching

skills. A greater effect may be achieved in the future when teachers are more experienced. This also states the importance of pre- and in-service teacher training [22].

Underreporting is expected especially if threatening questions are asked, as is the case with drinking and driving. The effort in this study to check on the reliability of self-reported DWI behavior gave reason to be cautious with self-reported data, but gave no reason to change our conclusions.

Nevertheless, social desirability remains a problem with self-reported data on undesirable behavior. It is probable that those people who mailed back the questionnaire (77%) at the follow-up, were more likely not to drive after drinking. On the other hand, people who did not mail back the questionnaire (23%), did not differ in drinking behavior (average number of beverages) as measured at the pretest. Social desirability or underreporting may mask the true effects of the DWI program.

Our interpretation of the non-significant effects on DWI behavior is as follows [14]: First of all, change in knowledge and attitude is necessary but not sufficient to produce desirable behavior change. Another necessary condition to fulfill is that people must learn certain social skills. It is conceivable that too little attention is paid to alternative behavior possibilities (how to resist social pressure). More accent on a social competency approach in which skills are taught to resist social influences might have been more effective [18]. In the program the textbook is the only element paying attention to behavior possibilities. In comparison with written information, role-playing is probably a far better method because of actual practice of alternative behaviors [14, 23]. However, the setting of driving schools limits their impact. If possible, however, DWI programs should use peers as discussion leaders (peer-led system) [24], and should attempt to have participants experience the effects of DWI directly [25], for example, on closed driving circuits or driving simulators. Another important factor in the process of behavior change is self-efficacy. The teacher could try to enhance students expectations if they are low ("It's not gonna work for me").

Also, more attention should be paid to behavior permanence. Once the desirable behavior is established, it is important to ensure its maintenance. To measure this and other effects on the long term, longitudinal research is necessary.

In order to prevent relapse, age-appropriate booster sessions or mailing information afterwards from time to time are recommended [26]. This function can be accomplished by public information programs (campaigns as a reminder).

This program integrated assumed effective conditions on a micro level but not on a macro level. Conditions on macro level such as coordination, guaranteed continuity and political support of action are also factors of importance for a successful preventive strategy [13].

The impact value of the program may be enhanced by broadening the implementation, especially in secondary education. Impact may also be enhanced by including questions on alcohol, medicines, and drugs in the Driver Examination.

At the moment, the Dutch government examines how this last suggestion can adequately be implemented.

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